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Original Article

Evaluation of transmission routes in patients with acute hepatitis B

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ABSTRACT

Aims: In this study, we aimed to determine the possible transmission routes in patients diagnosed with acute hepatitis B virus (HBV) infection by anamnesis, physical examination and serologic tests.

Methods: For this purpose, 44 patients hospitalized with acute hepatitis B in the Infectious Diseases and Clinical Microbiology Clinic of Ankara Numune Training and Research Hospital were included in the study. Patients were questioned about possible transmission routes. The diagnosis of acute hepatitis B was based on anamnesis, physical examination findings, anti-HBcIgM positivity by ELISA, absence of HBsAg positivity for more than 6 months and an increase in liver enzymes AST and ALT values 8-10 times above normal levels. HBsAg, HBeAg, AntiHBe serologic tests and Anti-HDV antibody against hepatitis delta virus (HDV) were also investigated in the sera of patients with acute hepatitis B. Possible transmission forms were questioned and recorded in the patient follow-up forms. All serologic markers were analyzed by ELISA (Organon, Netherlands).

Results: Of the 44 patients included in the study, 29 (66%) were male and 19 (34%) were female. The mean ages of male and female patients were 36.6 (24-66 years) and 31.6 (23-60 years), respectively. When the patients with acute hepatitis B were evaluated in terms of possible transmission routes, 8 (18.2%) of the patients had HBsAg positive spouses, 3 patients had a history of surgical intervention in the last 6 months, 3 patients had a history of dental intervention, 2 patients had a history of blood transfusion in the last 6 months, and 2 patients had more than one possible transmission risk. Twenty-six (59.3%) patients had no possible route of transmission.

Conclusion: Our findings revealed that possible transmission routes could not be identified in more than half of acute hepatitis B patients. In addition, we determined that 18.2% HBsAg positivity in the spouses of acute hepatitis B patients may be a possible route of transmission. In conclusion, we believe that patients with acute HBV infection should be evaluated for possible transmission routes, family members of acute hepatitis B patients should be screened for HBV infection, those with negative anti-HBs antibodies should be vaccinated, and relatives of HBsAg positive patients should be checked periodically.

Keywords: Acute hepatitis B, transmission routes, Anti-HBc IgM, transaminase enzymes

INTRODUCTION

Hepatitis B virus (HBV) infection is an important public health problem worldwide.[1] Hepatitis B virus can cause both acute and chronic disease. The World Health Organization (WHO) estimates that 254 million people will be living with chronic hepatitis B infection in 2022, and 1.2 million new HBV infections will occur each year. According to WHO data, HBV infection caused an estimated 1.1 million deaths in 2022, mostly from cirrhosis and hepatocellular carcinoma (primary liver cancer).[2] Hepatitis B and hepatitis C viruses are the leading causes of liver cirrhosis and liver cancer and are important causes of mortality and morbidity.[3]

HBV is a DNA virus transmitted to humans parenterally (with blood and blood products), transplacentally, postnatally (from mother to child), percutaneously, sexually, horizontally (transmission between family members) or by close contact.[1,4] Primary HBV infection is an infection that can only be transmitted from infected individuals to other people, and it can be self-limiting, self-resolving or lifelong. HBV is an important cause of fulminant hepatitis, chronic liver disease, cirrhosis, and hepatocellular cancer.[5-7]

There are approximately four million patients with hepatitis B virus infection in Turkiye. The worldwide distribution of the infection is categorized into three groups: prevalence of chronic HBV infection, overall infection rate, age at acquisition of infection and the most common route of transmission. In highly endemic areas, more than 10% of the population is infected with HBV. In moderately endemic areas, the prevalence of chronic HBV infection is between

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2-10%. In low endemic areas, carriage is less than 2%. According to WHO data, Turkiye is included in moderately endemic regions with 2-8% HbsAg positivity.[8]

In a study conducted by the Turkish Liver Research Association (TKAD) in 2009 in which 5,471 individuals were screened, HBsAg positivity was reported as 4.0%, anti-HBs positivity as 32.0% and anti-HBc total positivity as 30.6%. The anti-HBe positivity rate in HBsAg positive patients was reported as 92.1%.[9] The risk groups for percutaneously transmitted HBV include infants of carrier mothers, spouses and family members of carriers, polygamists such as homosexuals or prostitutes, intravenous drug addicts, hemodialysis patients, patients living in nursing homes, immunocompromised patients and healthcare personnel.

In this study, we aimed to determine the possible transmission routes in patients with acute viral hepatitis B (AVHB) diagnosed by anamnesis, physical examination and laboratory tests who were hospitalized in Ankara Numune Training and Research Hospital.

METHODS

This article is based on a specialty thesis completed in 2000. No ethics committee decision was taken at that time. In this thesis study was conducted with the approval of the institution. All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

This study was conducted in 44 patients with acute viral hepatitis B (AVHB) who were hospitalized in the Infectious Diseases and Clinical Microbiology Clinic of Ankara Numune Training and Research Hospital. Only patients diagnosed with acute hepatitis B were included in the study, chronic hepatitis B patients and inactive HBsAg carriers were excluded from the study. For the diagnosis of acute hepatitis B, anamnesis, physical examination findings, serum transaminase values 8-10 times higher than normal and anti-HBc IgM positivity were required. Data on age, gender, occupation, hospitalization and discharge dates and HBsAg, Anti-HBc IgM, HBeAg, Anti-HBe, Delta Ag and Anti-Delta markers were recorded. Possible transmission forms were questioned and recorded in the patient follow-up forms. All serologic markers were studied by ELISA (Organon, Netherlands) method.[10]

RESULTS

Of the patients included in the study, 29 were male (66%) and 15 were female (34%) ($p<0.05$). The mean age was 34.9 years and the age range was 23-66 years. The mean age was 36.6 years in the male group and 31.6 years in the female group. The distribution and mean age of patients hospitalized with acute hepatitis B according to gender are shown in Table 1.

The evaluation of AVHD patients in terms of possible transmission routes is shown in Table 2.

Table 1. Gender distribution and mean age of patients hospitalized with acute hepatitis B

Gender	Number (%)	Average age	Minimum-maximum
Male	29 (66)	36.6	24-66
Famele	15 (34)	31.6	23-60
Total	44 (100)	34.9	23-66

Table 2. Evaluation of AVHD patients in terms of possible transmission routes

Possible transmission routes	Number (%)
HBsAg positivity in spouse	8 (18.2)
History of dental intervention	3 (6.8)
History of surgical intervention in the last 6 months	3 (6.8)
Blood transfusion in the last 6 months	2 (4.5)
Multiple possible transmission risks	2 (4.5)
Possible transmission route undetermined	26 (59.3)
Total	44 (100)

Anti-HBc IgM was positive in all 44 patients with acute hepatitis B included in the study. HBsAg was positive in all but one patient. The HBsAg negative patient was considered as acute hepatitis B infection during the window period. Anti-HBe antibody was positive in 19 (43%) patients. The age, gender and serologic test results of the patients with AHD are shown in Table 3.

None of our AVHD patients had fulminant hepatitis or cholestatic course during clinical follow-up. Since long-term follow-up of the patients could not be performed, chronicization or inactive carrier rates could not be determined.

DISCUSSION

Following an incubation period of 60-180 days, acute hepatitis B virus infection can be seen in four different forms: icteric, anicteric, cholestatic and fulminant forms. In 5-20% of adults infected with hepatitis B virus, acute

While hepatitis symptoms occur, 65-80% may present as a subclinical infection or anicteric hepatitis picture.[11]

The rate of chronicization in acute hepatitis B infection varies depending on factors such as age, gender, anicteric form and presence of immunosuppressive status and this rate has been reported to be between 5-10% in adults.[7,12]

Çavuşlu et al.[13] evaluated 101 patients with acute hepatitis B. Fulminant hepatitis was observed in 3 cases and cholestatic course was observed in 3 cases. In the present study, we found HBsAg positivity in 9 (20.4%) of the spouses of patients with AVHD. None of our AVHD patients had fulminant hepatitis or cholestatic course during the follow-up period. Since long-term follow-up could not be performed, we could not determine how many of the patients became chronic.

The main transmission routes of HBV are parenteral transmission, sexual transmission, vertical transmission from mother to infant and horizontal transmission between family members.[14] In developing countries, vertical transmission (transmission from infected mother to newborn) and horizontal transmission (especially domestic contact with infected individuals) play an important role.[15]

The most important source of parenteral transmission is contact with blood and body fluids of HBV-infected patients. Parenteral transmission can be seen especially in those who use intravenous drugs with a common syringe, contaminated sharps injuries, tattooing, acupuncture, ear piercing, circumcision which may cause bleeding, use of common objects (toothbrush, razor blade, nail scissors), injector sticks.

Table 3. Age, gender and serologic test results of AVHD patients

Sequence No	Age	Gender	HBsAg	Anti HBclgM	HBeAg	Anti-Hbe	Anti Delta
1	28	E	+	+	+	-	-
2	60	K	+	+	-	-	-
3	24	E	+	+	-	-	-
4	34	E	+	+	-	-	
5	31	E	+	+	+	-	-
6	23	K	+	+	-	-	-
7	25	E	+	+	-	+	-
8	49	E	+	+	--	+	-
9	27	K	+	+	-	+	-
10	26	K	+	+	-	+	-
11	52	E	+	+	-	+	-
12	38	K	+	+	-	+	-
13	30	K	+	+	-	-	-
14	24	E	+	+	+	-	-
15	18	K	+	+	+	-	-
16	25	E	+	+	-	-	-
17	24	K	+	+	+	-	-
18	34	E	-	+	+	-	-
19	42	E	+	+	+	-	-
20	32	E	+	+	+	-	-
21	40	E	+	+	-	+	-
22	33	E	+	+	-	+	-
23	27	E	+	+	-	+	-
24	28	E	+	+	-	+	-
25	27	E	+	+	-	+	-
26	24	E	+	+	-	+	-
27	29	K	+	+	-	-	-
28	31	E	+	+	-	-	-
29	26	K	+	+	--	+	-
30	60	E	+	+	-	+	-
31	26	E	+	+	+	-	-
32	43	K	+	+	-	+	-
33	27	E	+	+	+	-	-
34	62	E	+	+	-	+	-
35	32	K	+	+	-	-	-
36	66	E	+	+	+	-	+
37	58	E	+	+	+	-	-
38	49	E	+	+	-	+	+
39	52	K	+	+	-	+	-
40	42	E	+	+	+	-	-
41	24	K	+	+	-	+	-
42	23	K	+	+	-	-	+
43	33	E	+	+	+	-	-
44	29	E	+	+	+	-	-

In addition, parenteral transmission is also possible through transfusion of infected blood and blood products.[14] The most common route of transmission of HBV in hemodialysis patients is parenteral transmission.[16]

Apart from parenteral transmission, hepatitis B infection can also be transmitted sexually, from mother to infant via vertical transmission, transplacental transmission or in the postnatal period.[4] In a study conducted in 10 centers in Turkiye, Mıstık et al.[17] reported HBsAg positivity as 9.2% in the spouses of patients with acute hepatitis B. In our study, HBsAg positivity was found in 9 (20.4%) and Anti-HBs positivity was found in 14 (31.8%) spouses of patients with AHBV.

In a study conducted by Kılıçturgay et al.,[18] the rate of HBsAg positivity in the spouses of patients with hepatitis B was reported as 13.5%. In another study conducted in Turkiye, the rate of HBsAg positivity in family members of HBsAg positive patients was reported as 12.3%.[19] In our study, the possible transmission risk of surgical and dental procedures alone was determined as 6.8% and 6.8%, respectively. In the study of Mıstık et al.,[17] the transmission risk rates of dental and surgical procedures were reported as 13.2% and 8.8%, respectively.

In a study conducted by Kılıçturgay et al.[18] in 192 cases of acute hepatitis B, the rate of dental intervention as a possible route of transmission was reported as 9.3%. In the present study, blood transfusion in the last 6 months as a possible route of transmission was found to be 4.5%. In the study of Mıstık et al.,[17] the rate of possible transmission by blood transfusion was reported as 4% and in the study of Kılıçturgay et al.,[18] the rate was reported as 4.6%. Horizontal transmission is the transmission of the virus between family members within the household without demonstrable parenteral, sexual or perinatal transmission. Horizontal transmission is thought to be the result of contact of body fluids such as infected blood, saliva, etc. with defective skin.[19] In the study by Mıstık et al.,[17] this rate was reported to be 44.4%, while this rate was reported to be 40% in the study by Kılıçturgay et al.[18]

Baş[20] reported HBsAg positivity in the spouses of 184 (22.4%) of the patients in a study conducted in 820 chronic hepatitis B and inactive hepatitis B carrier patients. It was reported that this low rate may be due to pre-marital screening and vaccination of the spouses of HBsAg positive cases. It was also reported that sexual transmission may be a possible cause of this transmission. In the same study, when the patients were evaluated in terms of the use of common items at home, it was reported that using the same towel ranked first with 83.2%, followed by using the same razor and nail clippers with 79.3% and using the same kitchen utensils with 69.8%. HBV contamination of shared items may be a possible factor in horizontal transmission within the household. In the present study, the rate of HBsAg positivity found in nine (20.4%) of the spouses of 44 patients with AVHD was similar to the rate of 22.4% reported by Baş.

Alkan et al.[21] evaluated the risk factors for possible transmission and chronicization rates in 48 patients with AVHD. In the study, family history of hepatitis B in 9 (18.8%) patients, suspicious sexual contact in 6 (12.5%), history of blood transfusion in 6 (12.5%), mucosal or cutaneous contact with infected blood and body fluids in 5 (10.4%), working in a risky job (health worker, nursing home staff) in 3 (6.3%), hemodialysis treatment in 2 (4.2%), tattooing in 2 (4.2%) were reported as possible risk factors. In the same study, possible risk factors could not be determined in 12 (25%) patients and it was reported that 4 (8.9%) of the patients developed chronic HBV infection. In our study, the rate of patients whose possible route of transmission could not be determined (59.3%) was higher than the rate reported by Alkan et al.[21]

Dığrak and Tezel[22] investigated the knowledge and attitudes of patients about HBV in a questionnaire study conducted in 244 HBsAg positive male patients. The source of information was reported as health personnel in 51.9% of the patients. While 88.4% of the respondents correctly answered that HBV can be transmitted through blood, the rate of those who correctly knew that vaccination protects against the disease was reported as 80.7%.

Limitations

Since long-term follow-up of AVHb patients could not be performed in our study, it could not be determined how many of the patients developed chronic hepatitis B and how many developed inactive carriages.

CONCLUSION

Patients with acute HBV infection should be evaluated for possible transmission routes, family members of patients with acute hepatitis B should be screened for HBV infection and informed about transmission routes, and those with negative anti-HBs antibody should be vaccinated. In addition, we believe that periodic control of the relatives of HBsAg positive patients may prevent long-term complications related to HBV.

ETHICAL DECLARATIONS

Ethics Committee Approval

This article is based on a specialty thesis completed in 2000. No ethics committee decision was taken at that time. In this thesis study was conducted with the approval of the institution.

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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